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SCHOOL AND SOCIETY

Volume XVIII SATURDAY, SEPTEMBER 22, 1923 Number 456

THE STUDY OF INDIVIDUAL ABILITIES—THE NORMAL CHILD[1]

THERE are problems in the education of children the understanding or solution of which is now hampered by a lack of knowledge in regard to certain general facts about individual development. This situation has long been recognized by students approaching these questions from various angles, as well as by parents and teachers.

As a concrete illustration of the above statement, I may quote from a recent discussion by Henmon and Livingston in regard to the variability in the rate of mental development at different ages:

> There is a widespread belief . . . that individual differences are greater during adolescence than at any other time in life and that the development from childhood to adolescence is not gradual but saltatory.
>
> This theory has important practical applications and its influence is plainly visible in our present system of school organization. The contention that youth is the period of great fluctuation and that therefore throughout the high school age there is a decided increase in variability in all mental functions implies that the secondary school should provide a wider range of elections in the curriculum, smaller classes and more individualization of instruction, and greater versatility in methods of presentation of subject matter in order to appeal to the widely varied characteristics of a high school class. On the other hand (and this is the more serious consideration), the implied greater similarity between children in the grades offers an excuse for larger classes, for poorer teachers, and for forcing all pupils through the same process and by the same methods until the approach of adolescence.

After a thoroughgoing review of the available literature on the subject they conclude with this statement, with which our experience coincides:

> What we need for a final answer to the problem is repeated measurement of a great number of unselected individuals over the entire period of childhood and adolescence. Such data are, of course, nowhere to be found now.

Until within recent years the methods of estimating or measuring intelligence and school accomplishment have not been sufficiently advanced to make it feasible to measure the growth of a large number of individuals by repeated measurements. We now believe that our methods are more nearly adequate for this purpose, and we have, therefore, begun this year, with the aid of a subvention from the Commonwealth Fund, an extensive series of measurements of first and second grade school children with the intention of repeating these measurements annually on the same children throughout the period of growth, or as long as they stay in school.

In order to have a representative group 10 or 12 years hence, to allow for mortality, and for those who may move away or be otherwise lost to the investigation, we have so far this year measured over three thousand children.

In order to find out how the individual grows in body as well as in mind, our series of tests also includes those of physical or physiological development. Among the latter are at present included height and weight and bodily proportions, dentition and ossification as shown by X-ray photographs of the carpal bones. Hitherto, most investigations of physical development have applied but one or two of these measures to the same individuals. Each measure by itself is subject to certain errors. An average of several such measures will, we believe, furnish a more reliable in-

[1] Read before the Thirty-Second Annual Meeting of the Harvard Teachers' Association, Saturday, April 28, 1923.

dex of general physical development. This has been the experience in the field of mental testing; single tests were inconclusive, the combining or averaging of several tests has led to results of practical value. Furthermore, our conclusions are to be drawn not from the absolute measures, but from the increments or changes in the indices from year to year. A single measure of height or weight tells little of importance, but as first Wissler in this country and then notably Baldwin and Porter have shown, the repeated measurement of the height and weight of the same individuals over a period of years has told us a good deal about growth which we did not know before. These changes of a physical or physiological sort, when taken in connection with changes observed in the tests of intelligence and school accomplishment and when supplemented by the detailed and recorded observations of teachers, will, we are confident, give us some of the information the lack of which the above quoted writers deplore.

It may well be that the mental and physical development of the majority of children will prove to be regular and even and present no particular problems during most of the years of growth. At one period at least, namely, at adolescence, we have good reason to believe that this will not be the case even for the majority. In the exceptional child, and he is the one about whom by denotation most of the problems of parents and teachers center, the course of development will not run even and smooth. Our present opinion, which may or may not be substantiated, but which is based on repeated observations on a relatively small number of individuals, is that we shall find among borderline cases, *i.e.*, those whose mental and physical growth does not deviate profoundly from the normal, the following conditions. A child somewhat backward in mental development, whose yearly increments in mental age have been small and who on repeated examination proves to be correspondingly backward in general physiological development, may frequently make up for his slow start before he reaches maturity. The prognosis in his case would be better than in the case of a child of the same early mental level but who, at the same time, is found to be physiologically well along in the course of development. The fact that he has come on so well in general physical development in the early years without corresponding mental growth would make his prospects less hopeful. Similarly, some of our much heralded prodigies, who have rather petered out in later years, may prove to have maintained their relative superiority for a few years because of early maturing, supplemented by a kind of hot-housing. The mental age as now secured is the result of several factors, native intelligence, relative physiological maturity, physical health and vigor and environment, the last including special training or practice. The results of the present investigation should allow of an earlier analysis of these factors than is now possible. We have at hand, as a result of earlier studies, the records of some children upon whom certain of the proposed measurements have been repeated annually for five or six years. Among them we find cases in which slow development in early years has been followed by rapid physical and mental development, resulting in a marked change in the ratio of mental to chronological age, *i.e.*, in their intelligence quotients. One of these cases, who at the time of her first examination was 9 years and 11 months old and had a mental age of 9 years and 10 months, has been included in a published report by Mr. E. A. Lincoln (*J. of Ed. Psych.*, Nov., 1922). In three years' time she attained a mental age of 17 years and 8 months, giving her an intelligence quotient of 136 points, or a gain of 37 points. At the time of the first examination she was

at about the 68th percentile in physical height of girls of her own age; at the end of the three years she was at the 87th percentile. The acceleration in mental development was thus accompanied by a somewhat corresponding acceleration in physical growth.

Cyril Burt, in his monumental study ("Mental and scholastic tests," London City Council, 1921) of the cases of 3,000 London school children, upon some of whom repeated measurements have been made, reaches similar conclusions. In speaking of the special class cases, he notes that there is a small but steady drift towards a diminution in the mental ratio. A few, however, showed the opposite—some improvement in mental ratio. Of these he says:

> In every case, with one dubious exception, the subsequent history unequivocally suggests that the partial restoration must be connected with some deeper cause than mere accident or freak of fortune. That cause appears to be an intrinsic irregularity of mental growth. Such children are creatures of deferred maturity. Their development is not arrested; it has been postponed. Although upon a lower plane, their mental growth runs parallel with that of many cleverer children, in whom the phenomenon is more familiar. There is many a sharp child whose cycle of growth is like that of the mulberry tree, presenting first a long delay, and then a sudden yield of flower and fruit together. Their existence is recognized in the double scholarship examination. In London at the age of thirteen a second examination has been instituted specifically for those who in the current phrase "bloom late," and whose anticipated powers, therefore, do not ripen by the age of ten. In like fashion, among the classes for defectives, time and due season will here and there disclose a sporadic "school autumnal."

There are certain findings which have resulted from the work of the present year, and of various preliminary studies to which I may now turn.

X-ray photographs of the ossification of the carpal bones have been made in all grades and ages of children from the first through the high school. An objective method has been established by Mr. D. A. Prescott for measuring the individual differences and the changes observed in the various age groups. These differences are expressed in terms of so-called anatomic indices. A wide range of variation is found in children of the same chronological age. Boys of six years three months to six years eight months inclusive have ratios varying from .5 to 2.20, or, expressed in terms of anatomic ages, from four years to nine and one half years. Boys thus differing but six months in chronological age differ by as much as five and one half years in anatomical development. These ratios are distributed symmetrically about their mean for a given age and have the same range of variability which has been found in the mental ages of children. As will be shown to be the case later of mental ages, this variability doubtless increases in direct proportion to the chronological age.

The findings of others in regard to sex differences have been confirmed by Mr. Prescott. Girls within three months of six years of age are at practically the same level of development as boys of an average age of seven and one half years. Girls at this age are thus one and one half years in advance of boys in the anatomical development of the carpal bones. This difference between the average development of boys and girls appears to remain practically constant from six years to maturity. Girls have at 13½ years reached the same stage of development as boys of 15. It would seem that these differences must also show in the mental levels of the sexes, but our mental tests, as at present constituted, do not show such differences.

The gross changes in ossification of the carpal bones, such as can be recorded in the X-ray photograph, cease in the cases so far measured on the average between ages 13 and 14 in girls and between 14 and 15 in boys. Our cases are not as yet representative enough to draw final conclusions, but

it is at least interesting to recall in this connection the findings resulting from the psychological examinations in the U. S. Army of an average adult mental age of 13½ years and of certain conclusions which the speaker has recently made from the mental tests of an unselected group of school children of both sexes which point to an average adult mental age of approximately 14½ years.

The intelligence ratings of the children under investigation are being made by means of group tests of intelligence. Two such tests are given at short intervals, and they are supplemented in special cases by an individual examination. The group methods of testing intelligence are new and somewhat untried. We are accumulating facts in regard to their reliability when used by capable examiners. This is not the time or place to discuss these matters, but I should like to compare some of our findings with the group tests with certain conclusions reached by Mr. Cyril Burt in the extensive investigation above mentioned which was made by means of the individual intelligence examinations.

The group tests show at each age, beginning in our experience, with the age of six, the same approximation to the normal distribution curve as found by Burt and previous extensive studies with individual tests, and the same variabilities. Children of age six at school entrance show differences of six years in mental age, and, disregarding the special class cases and a few very exceptionally gifted children, the range of mental age differences among ordinary school children increases by one year with each added year of chronological age up, at least, to the age of twelve. The twelve-year-olds differ in mental age by twelve years—just double the extent of differences among the six-year-olds.

Expressing these differences in terms of intelligence quotients and taking by way of example a group of 1,181 children of ages 9, 10 and 11 in three Massachusetts towns having an average I. Q. of 100, 50 per cent. have intelligence quotients between 89 and 111, 82 per cent. between 78 and 122, 95 per cent. between 67 and 133, and 100 per cent., or the total range, between 53 and 158 or a total of 105 points of difference in intelligence quotients.

In these same towns the differences in mental age between pupils in the same grade range from five or six years in the first grade to as much as nine years in the seventh or eighth grades. The middle half of the classes vary by ten months in the first grade to two years and a half in the eighth grade.

As these results are typical of our findings, we may say that according to current practice a class sufficiently homogeneous for ordinary class instruction is one at least half of whose members differ in either direction from the average by not more than approximately 10 points in intelligence quotient or the equivalent in mental age. In forming special classes of mentally deficient or mentally superior children it may be noted that the intellectual differences between 15 or 20 of these children equal or exceed that of 30 or 40 children grouped nearer the average. This is the theoretical explanation of the reason why as a result of practical experience it has been found necessary to limit the size of special classes to about half that of the ordinary classes.

The median intelligence quotient of children in the early grades of neighboring schools and towns has varied from approximately 85 to 115. Children three years retarded in the grades of the latter town would be but a little below the grade average for their age in at least one of the schools of the first town.

Among the third grades of one city are three classes: Class A with a median I. Q. of 122, Class B with a median I. Q. of 103, and Class C with a median I. Q. of 83.

There are, then, 39 points of difference between the median I. Q. of Class A and Class C. Class A is on the average two and one half months younger chronologically than Class B, but is 18 months older on the average in mental years. Yet Class B excels Class A in tests in the four processes of arithmetic, in solving arithmetical problems, and in the rate and quality of silent reading as tested by standard tests. Class C averages a year older in life years than Class A, the mental age averages two years and eight months less, yet this class secured the same median score in the arithmetic test, but it did much worse in the reading test. Such comparisons suggest, as Burt remarks in reporting similar findings, "that intelligence varies more widely than school capacity, and that possibly school methods prime and prod the backward a little nearer to the average standard, but do not exploit to its utmost the inborn intelligence of the more acute. They tend to level attainments without equalizing ability."

Burt, also, in discussing the line of demarcation of the feeble-minded from normal children, notes that the children in the London special classes for mental defectives are retarded in educational achievement and in intelligence by approximately 30 per cent., or more of their chronological ages, giving both educational and mental ratios (or intelligence quotients) of approximately .70 or under.

The same mental ratio, if applied to adults, would place the line of demarcation as far as tests can draw such a line between the normal and the feebleminded at between 11 and 12 years of age. Our studies agree with those of Burt in showing that there is a marked difference between the psycho-educational or scholastic and the social or economic criteria of mental deficiency. Children three years or more retarded in school and with intelligence quotients of between 50 and 70 are in a surprising number of cases able, after leaving school, to earn a living, manage their affairs with ordinary prudence and under the prevailing economic conditions successfully discharge the usual requirements of their occupations. Burt finds that an intelligence quotient of 50 and a mental age of seven or eight is the level at which the arbitrary line separating the normal from the feebleminded adult should be drawn, in so far as it can be drawn by mental tests, and with this finding our experience is also in agreement.

In speaking of the line which for many purposes we must draw between the normal and the subnormal, I have also reached the line which separates my special province this morning from that of the following speaker, and I will now stop lest I trespass on his domain.

In concluding it is a pleasure to make mention of the cordial relations which have been established with the officers and teachers of the cooperating schools and the assistance which they have given to furthering this investigation. Even with the generous subvention of the Commonwealth Fund, the progress of this study could not have reached its present stage except for the zeal and loyalty of those who are cooperating and assisting in it.

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USE OF INTELLIGENCE TESTS IN EDUCATIONAL ADMINISTRATION IN THE PROVIDENCE SCHOOLS[1]

THOSE who are engaged in educational and vocational guidance in the public schools must keep in mind the finished product of the schools, the whole child—

[1] Read before the Thirty-Second Annual Meeting of the Harvard Teachers' Association, Saturday, April 28, 1923.

not the child in this grade or during this term or in this school—but "How can we make the most of each child in the time which we have?"

In order to obtain this broader view of the problem, to see the whole problem, a certain perspective must first be obtained. The teacher's point of view is too narrow, for it concerns itself only with one grade or subject; the principal's point of view is too narrow, for it concerns itself only with a few years; the superintendent's point of view is clouded by a thousand problems of administration. Some one must be delegated to face the problem of making the most of each child during the time he is in school, and helping him to make the most of himself after he has left school. This is the point of view of an educational guidance program of which vocational guidance is the climax in the last act.

I have likened it to the last act of a drama because it is not merely an incident —the finding of a job—but a climax prepared for from the very beginning, the alternative choices gradually narrowed until the problem is solved in the only logical way: by self-discovery through tryouts and measurements, by accurate knowledge of the occupational field, by thorough preparation for the occupational level of the child's own greatest usefulness, and finally by the choice of a vocational field and a plan for adequate vocational training in preparation for entering upon and earning promotion in that field.

It is extremely wasteful and difficult to try to solve the problems of the vocational guidance of children who have not had the advantage of careful educational advice and direction. It is like trying to salvage unfinished or damaged products in industry. The result is patchwork and bears no standard trademark. Industries would all go bankrupt if they were run on the same basis as the average public school system. Can you imagine a great manufacturing concern without a sales department; without an inspection department to measure, inspect and properly classify or label the product; without a routing department to economize in time and methods of manufacture; without an advertising department or service department or personnel department? And yet this is the way that the American people conduct their greatest civic enterprise. The schools exist for the purpose of helping young Americans to grow to become useful citizens who will fit into the life of the community as productive, civic, economic and social units, and yet there is no one to follow the individual child through the process. We supervise the machine but not the product.

As long as twelve years ago Professor Thorndike pointed out the need of specialists in the educational guidance of school children. The specialists in the various subjects of the curriculum are seldom qualified for this work. There is need of a new department in school administration which shall specialize in individual differences of children, in adjustments of many kinds to meet individual needs, and in educational and vocational guidance. Such a department is similar to the personnel departments in a few of our most progressive commercial and industrial concerns. Their duty is to make the most of their human resources by proper placement and training. In school systems where the destinies of so many thousands are often determined, such work is absolutely essential. It must not be left to chance, or to the blunders of the untrained, however willing and well meaning they may be.

Such a department is not only essential to the welfare of the children, but also to the school system itself, since it will greatly increase efficiency and pay for itself many times over in actual saving. Unless the rising costs of education are to be met by turning children out of school at an early age, they must be met by giving to each

child the type of education which is best adapted to his peculiar needs and abilities, and for which there is the greatest probability of practical application. Too many are taking courses for which they are *not* fitted because it is no one's business to know for what they *are* fitted.

Within the past few years new instruments have been developed for measuring individual differences. Properly used, intelligence tests can be made as important in education as the compass is in navigation. But they must be used with the *whole child in mind*, and that point of view implies some one whose business it is to specialize in the guidance of children.

I have only a moment to touch upon the high spots in the Providence program for the application of the results of intelligence testing to school administration. With our point of view established, however, this should be sufficient.

Let me proceed from the usual to the unusual.

1. Pupils who are chronologically retarded more than two years fall into two classes: (a) Those who have developed more slowly mentally and have failed because they were underage mentally for their grade although overage chronologically, and (b) those who have been retarded through accidental causes such as illness, late entrance, lack of educational opportunity, etc. In Providence the first of these groups throughout the whole elementary school system will be subdivided into two groups: (1) Those who are so slow that they are incapable of reaching the seventh grade before the age of sixteen; and (2) those who will probably not be able to graduate from grammar school before they become sixteen. These facts can be determined with practical certainty by the time the children are ten or twelve years old and consequently differentiated courses have been provided. The slower children will be placed in "special classes," and those not so slow in "differentiated classes." The second main group—those accidentally retarded—will be placed in "opportunity classes" where they will have a chance to regain lost time.

At this point it may be well to remark that many school people seem to proceed on the theory that children have all the time in the world in which to secure an education—their time is not worth much. There could be no greater fallacy. Time is probably the most important factor in elimination. If you doubt it, look at the age-grade classification in the report of your own superintendent. From the age of fourteen on children leave school (1) because they are older than the others in the class, (2) in the case of girls because other girls their own age are earning money, wearing better clothes and are able to attract attention, (3) in the case of boys because other boys who work can afford to dress better and beau the girls around, (4) because the father, mother, older brother or sister was helping in the support of the family at their age, (5) because they want to get married, (6) because they must begin learning a trade, and (7) because of the restlessness of youth and the lack of practical courses in the schools. In one of our high schools not one of eighty graduates was over eighteen years of age in spite of the fact that our elementary schools show ten pupils who are retarded for every one who is accelerated. Many of the graduates, however, were seventeen, sixteen and even fifteen years old and invariably the youngest were distinguished for high scholarship. What had happened to the retarded children? And yet some one will say that time does not count.

Many of the greatest economies which have been effected by scientific management have come through time saving. There are abundant opportunities for such economies in our educational system. And I do not mean the time of the teacher—

important as that is—I mean the time of the pupil.

In American cities the average cost per pupil in average daily attendance varies from $50 to $120. The average of eighteen eastern cities of over 100,000 population is about $95. If $80 per pupil—the approximate cost in Providence—were taken as a fair figure, let us see what the saving in children's time would amount to. If a bright child can do eight years' work in seven or even six years, the cost per pupil will be correspondingly reduced as if we were paying his tuition in a private school. Moreover, the pupil would graduate from high school or college earlier and his earning would become available so much sooner. The saving to the family in earning power would amount to about $500 per year if the student did not go to college and to about $1,000 per year if he graduated from college. His earning life is increased from one to two years.

In Providence last term in each grammar grade the pupils in the upper third or fourth of each class were given the Lippincott-Chapman Classroom Products Survey Tests to determine the degree in which each had mastered the fundamentals of mathematics and language. To those who already equalled the median score of the grade above them, an intelligence test was given. Those who were two or more years overage for their grades mentally were selected for more rapid advancement. Lists containing full information were sent to each principal and he was requested to study each case with a view to plans for more rapid advancement this term. Pupils were not to be "skipped" but to be placed in double-grade rooms where the lower class consisted of selected bright pupils and the upper class of slow or average pupils. The experience of several years has shown that at the end of the term the lower class has invariably excelled the upper class in quality of work. In this way pupils do the work of two grades in one term. When such a classification is impossible pupils receive special help either from the special room teacher or from the regular teacher after school or during free periods. The percentage of pupils failing to make the two grades is practically negligible.

It must be remembered that less than one fourth of all of the pupils of the grammar grades were tested and only about one fourth of those tested were promoted by this plan. The total for the whole city, however, was over 700. This represents a saving to the city of 350 pupil years at $80 per year or $28,000. The saving to the families in earning power would be (1) at graduation from high school, 40 weeks at $12–$15 or about $500 per pupil per year or a total of $175,000, (2) at graduation from college $1,000 per year for 350 pupils or $350,000—and practically all of these pupils are at least college possibilities.

The plan has proved so successful that next year it will be used throughout all elementary school grades. The pupils are to be classified not only for purposes of efficient instruction, but also for more rapid advancement. Certain grades are to be designated as those best suited for the purpose of the more rapid advancement of pupils. In fact intelligence tests have made possible the breaking of the educational lock step and have made the classification of pupils much more accurate and less difficult.

Lest some one accuse us of "forcing" children and declare himself in favor of enrichment as opposed to acceleration, let me make three points: (1) Many practical difficulties stand in the way of enrichment in elementary grades; overcrowded rooms, inertia in the teaching force, small schools, etc.; (2) Our program still leaves room for enrichment in other than double-grade rooms wherever such a course seems practicable. It can not be guaranteed in the elementary schools, but it can be in the

high schools where larger numbers make a finer classification possible, and elective courses open up many other possibilities; (3) The Providence program promotes only pupils seriously *overage for their grade mentally*. It simply keeps bright children from becoming more mentally over-age for their grades. An illustration may clear up this point: A bright child with an I. Q. of about 130 goes through school at the regular rate. He enters at six with a mental age of eight and graduates at fourteen with a mental age of eighteen. He was two years over-age for his grade mentally when he entered and four years over-age for his grade mentally when he graduated. There are many such cases in every graduating class. The Providence program permits such a child to gain two terms out of eight in the primary grades and a like number in the grammar grades. Consequently, he graduates at the age of twelve with a mental age of sixteen and is still two years over-age for his grade mentally, the same amount as he was when he entered. Our program merely keeps him from becoming more retarded mentally and leaves plenty of room for all possible enrichment in the grades. It gives him twelve years of school in ten years, brings college and professional school nearer and prevents loss of interest and habits of laziness and inattention.

In two of our high schools where pupils have been classified in sections according to intelligence quotients, failures have been greatly reduced, the efficiency of teaching increased, group educational guidance made possible and enrichment guaranteed. Tests have also been helpful in preventing slow children from electing courses which are too difficult and which have little likelihood of finding practical application in their lives; such as college preparatory mathematics, foreign languages and college preparatory science.

Intelligence tests alone will not accomplish these results. It is not the tests, but the *use* that is made of them which is important. They may be abused as often as well used, and they *may not be used at all* except for curiosity and to justify teachers in flunking a large number of pupils. They may, however, when properly used, become an important factor in the development of scientific personnel work in education.

RICHARD D. ALLEN
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MENTAL ATTITUDE OF CHILDREN TOWARDS SCHOOL WORK[1]

DURING the last few years thousands of children have been tested with intelligence tests. This has developed from the psychological test given to recruits during the war. Gradually teachers and administrators are coming to learn the value of the tests and the possibility of their uses as another "straw to indicate which way the wind blows" in regard to a certain child.

I can not refrain at this time, however, from pointing out the possibility of their misuse. For example, on the basis of the results obtained from testing about 17,000 children with the National Intelligence Test, Boston has established certain norms for different ages. For the children younger than ten years and for the children older than fourteen years, six months, the results are more or less theoretical because of the small number of cases. It is felt that the results between these ages are dependable. However, in Supplement No. 2 to "Manual of directions for the national intelligence test" we find that children twelve years-eleven months should receive a score of 115. On the other hand, according to the results in Boston, a pupil

[1] Read before the Thirty-Second Annual Meeting of the Harvard Teachers' Association, Saturday, April 28, 1923.

twelve years old should receive a score of 115. This difference in mental age of eleven months makes a difference of eight points in a ratio which has been called the I. Q.

To certain people a difference of eight points in the I. Q. seems very large. If, however, we think of the group intelligence test as a means of locating a pupil within certain groups, which may be called for convenience "inferior," "below average," "average," "above average" and "superior," the difference of eight points becomes a negligible factor. This difference between two sets of norms simply means that we have just begun the study. Eventually we shall probably find that the real norm is, perhaps, between the two norms referred to above.

The important point to be remembered is that, in finding this I. Q. by means of a group test, we must constantly bear in mind that there is a great possibility of fluctuation due to physical causes over which the examiner can have no control. This does not mean that the results may not be depended upon. Any good test is very reliable in locating a pupil within the groups mentioned above.

With these limitations in the group test and in the interpretation of scores, how can the results be used? Of what advantage can they be to the teacher? The advantages are many and stress is being laid on one or another, depending on the teacher and principal. Some are using them as a basis of promotion, others as a basis of guidance in other ways. In this guidance along any particular line, I wish to call attention to three groups of children.

(1) Those receiving high I. Q.'s who are doing poorer work than is warranted.

(2) Those receiving high I. Q.'s who do erratic work.

(3) Those receiving comparatively low I. Q.'s but not poor enough to be placed in a special class.

The first group to be considered consists of those children receiving high I. Q.'s who are doing poorer work than is warranted. "A. G." is a twelve-year-old boy in the lowest of seven seventh grades. In checking over the class, the teacher asked me how I found them.

"You have one bright boy," I said.

"And who may that be, pray?" she asked.

"A. G.," I replied.

"A. G.? A. G. could not tell you his name if you asked him quickly."

"Nevertheless, A. G. is a bright boy."

Later he was tested individually and showed an I. Q. of 123. I talked with the boy and found that he thought he had been "putting it over" on the teachers since entering the fourth grade. He, like others of his kind, knew he ought to change, said he was going to change, and like many of us has not yet changed to any marked degree.

"A. W." is considered by his teacher an average boy mentally. He did just about average work at all times, never showed any particular brilliancy, but was considered an ordinary "plugger." Two different group tests given eight months apart showed him to have an I. Q. of 146 and 145, respectively; an individual test gave him an I. Q. of 142. He is probably one of the brightest fifth-grade boys in Boston.

These two stories will illustrate the type of boy I am thinking about. These stories could be multiplied many times. When you have found out that such boys are bright, the problem has just begun. Here is a group of bright children who are not living up to their possibilities. Why? The answer to that question is the all-important thing. It may be that the boy is just lazy and by bringing certain pressure to bear he will reform and produce work more in keeping with his mental ability. On the other hand, his so-called laziness may be due to any one of a number of causes, or a

combination of causes which bring about an apparent laziness.

It may be that the boy's physical condition is not right, or it may be that he is having many outside interests which tend to distract his attention. These may be extreme interests in radio, wireless or something else of an industrial nature. It may be an excessive amount of church work. It may be excessive demands on the part of parents for outside work. It may be the lack of cooperation on the part of parents in the matter of home lessons and such other school matters as the teacher may ask to be done at home.

There is an almost unlimited number of reasons why the pupil may not live up to the potential possibilities. The boy now becomes a "case" or a problem to be solved. We have learned that he is a superior boy, but nothing which he has shown would indicate his superiority over his fellows. This means that every agency of the school—teacher, principal, nurse, doctor, attendance officer and any other agency which can be found—should begin gathering material on that case and all data should be filed in writing. Play habits, work habits, dominant interests, home conditions, playmates, use of leisure—anything which may tend to throw light on the school attitude of the child should be filed. After this diagnosis is made, and not until then, can we apply the remedy which will bring out the ability of the boy. It is probably much safer to concede that the results of the test are final than to conclude that the teacher's estimate is right and to conclude that the boy is superior and will display his superiority if we can find the key to change him from average to superior in his work.

There is another group of bright pupils who are not so easy to adjust as even this first group. In March, 1921, we gave the national intelligence group test to all sixth-grade children. Among these was a girl, "M. G.," who obtained a score of 168, one of the eighteen highest in over 6,000. Within a short time I heard about the case. On investigation I found that the girl had spent two years in one of the special schools. Up to ten years of age, "M. G." had never learned to read, write or do number work. Always she had hated the teachers consistently, and probably had studiously refused to learn. At the special school, by some freak of human nature, "M. G." liked the teacher, learned to read, write, figure and do general school work with others. At the end of two years "M. G." was placed in grade VI. Soon the room teacher found her reading everything that was good—history, travel, best of novels, short stories, etc. Why does "M. G.," a brilliant girl, receive a mark of "D" at the end of the year? The answer is found in "M. G.'s" attitude towards her work. To-day she may be feeling good, nothing goes wrong, and everything is lovely. To-morrow something crosses her and "M. G." goes into a tantrum from which she does not recover for two or three days. Meanwhile it is impossible to live with her.

A similar case was "P. S.," who was a very brilliant boy. He was a big, stout, rugged boy such as football fullbacks are made of. His father was French and a physician in New York. He died when "P. S." was a small boy. His mother married again and came to Boston. When "P. S." was in grade V he played truant and went to the White Mountains, spending four days there. He said he had been studying about them and wanted to see them at first hand.

He did not know how to play with his fellows. He told me that there was always a fight, and when it was over all were on the ground except him. I asked him if he thought he was a bully. He said "No," and judging from what he told me I think he was sincere. He seems to be a boy who might be termed "socially feeble-minded."

Finally, as a result of many escapades

"P. S." was sent to a private school. He got into more trouble there and on account of it spent nine months in the Lyman school for incorrigibles at Westboro. He left with a good record and entered the freshman class of one of our high schools. He is crippled, owing to an attack of infantile paralysis, and can not use his right leg but can use his right hand for writing if the writing is not continued too long. Socially, even now, "P. S." does not fit. He is still having trouble with his teachers and has little or no association with his classmates because of this social inadaptability.

Why, then, do these people find themselves misfits in spite of their mental ability? These two cases are typical examples of children whose emotions are not under their control. They are typical psychopathic cases. In this situation their mental ability becomes of secondary consideration. They can not reach the high pinnacle towards which their mental ability would lead them because of being held back by undue emotional strain. It used to be thought that these psychopathic conditions developed in later years and accompanied certain great physical changes. We are finding so many children with these abnormal symptoms that we are beginning to surmise that they start early in life instead of waiting until adult life. The big problem, then, is to get control over these emotions. It may be anger, jealousy, fear or any one of the long list of emotions. Such children should go to a good psychiatrist and let him determine what seems the best thing to do. The correct treatment of such children is beyond the majority of teachers and principals.

The last type to be considered is the dull boy. Not the moron, but the boy just above him and below the average group. These children are in every room and, together with the moron, comprise a very large percentage of those pupils who are termed repeaters. We have done comparatively little for them in our present organization. They form the bulk of our prevocational classes and so-called transfer classes. Mentally, they are outclassed by others in their grade group; physically, they outstrip most of the members. They are larger and stronger and do not fit into the play group. On the playground they generally congregate in one section of the yard, and unless something is done for them they may become a menace to the school. Plainly they are failures. They know it, their associates know it, and the teacher knows it. What can be done?

The first necessity is to realize that there is such a group and that they need a different treatment from the average pupil. In the past such a pupil has been in a grade, failed, repeated and then perhaps failed again and pushed on to the next grade because he has been two years in one grade. This does not solve the problem; it simply defers it so much longer. The fact is the boy has failed for two years and has now reached a stage where failure is expected on the part of teacher and pupil. Why not place the boy in a class where he can succeed? When will we learn that it is just as necessary for some pupils to take three years to do two years of standard grade work as it is for others to take two years to do three years of standard grade work?

If our theory of individual differences indicates anything it indicates that there is a group of children who are superior enough, mentally, to do the work much faster than the average pupil, and to a certain degree we have recognized them. The theory also indicates that there are other children who are mentally inferior to the average pupil. What all children need is the spur that success in a piece of work will give them. This spur of success in many cases is not obtained by the dull chil-

dren. Can it be obtained in any other way than by segregating these children and giving them work which they can do?

To sum up: The testing of children is for the purpose of obtaining a better knowledge of the pupil. The test is not an end in itself. Just as long as we did not know that malaria was caused by the bite of a mosquito, malaria could be treated in a certain way. After the real cause had been discovered any doctor who did not take this fact into consideration would be very negligent. Similarly, as long as we were obliged to depend on the judgment of individuals regarding mental ability, a certain procedure could be followed in our schools. It has been shown that standard tests, imperfect as they are, indicate the degree of mental and scholastic ability with greater accuracy than do the judgments of individuals. Therefore, are not superintendents, principals and teachers remiss in their duty if standard tests are not used and school procedure modified in light of the results?

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THE NEED OF SOME NEW CONCEPTIONS IN EDUCATIONAL THEORY AND PRACTICE[1]

THE study of the individual child involves the employment of psychological conceptions which exert a great influence, both upon the method of child-study and upon the theory of childhood. I propose to consider briefly four of these conceptions, namely, the conception of original nature, the conception of learning, the conception of individual differences, and the conception of a school-program, and my aim is to point out an alternative to the views on these four subjects commonly accepted or implied in most of our current educational theory and practice.

To make my thesis clear at the outset: it seems to me that the science of education has been rather markedly affected of late by the principles of a mechanistic interpretation of life, which has colored each of the four above-named conceptions. I do not wish to combat *mechanism* so much as to suggest that another hypothesis may be equally consonant with scientific method and procedure. You must therefore permit me to define mechanism in a somewhat restrictive, and perhaps not altogether accurate manner, in order that the alternative I propose may stand in sharp enough contrast to be clearly understood.

A mechanism, then, as I define it, is an assemblage of parts which work together by virtue of their juxtaposition. If I were to criticize the doctrine of mechanism as applied to life, my argument would be somewhat similar to the one advanced by Professor William McDougall, that the notion of a mechanism is derived from our knowledge of the working of machines, and that machines are an artificial product of man's ingenuity and not in any sense a product of unrestrained nature. A further objection to the mechanistic interpretation of life, as it seems to me, is that it is an outcome of a mathematical way of thinking about life, a way of adding and subtracting integers, which as a matter of fact we never find through observation. The idea that the universe is an arbitrary association of parts carries with it the corollary that every thing can be analyzed into ultimate or irreducible elements, and that these elements, by more or less chance concatenations, bundle themselves together and thus constitute both the things we perceive and our reactions to them.

The alternative I wish to propose is that

[1] Read before the Thirty-Second Annual Meeting of the Harvard Teachers' Association, Saturday, April 28, 1923.

nature works not with elements in arbitrary juxtaposition, but with figures and with forms; these are the characteristic entities of all science and of all being, and they can not be fully explained as arbitrary combinations of parts. On the contrary, the conception of a figure or form is based upon an integration, not only of parts but of *members* whose reality involves the membership-character of belonging to some whole. Thus there are no entities which exist in their own right, since units are always relative to higher degrees of unity.

I

A conception of original nature is obviously fundamental to educational theory and practice. As teachers we are called upon to educate a psycho-physical organism, and our point of departure is the organism as we find it. Our problem, therefore, is a psycho-biological problem, and in order to solve it we must have some idea of the manifold influences of heredity and environment upon the organism we are educating.

We have been adopting a schematic theory of the nervous organization of human beings as a net-work of pathways traversed by nervous currents, these paths in general running from the sense-receptors through the central nervous system and out again to the effectors in muscle and gland. It is a simple and an inviting scheme. It suggests that the reflex-arc is the basic mechanism of behavior, and also that habit-formation is the goal of education.

By virtue of nerve-connections laid down in the nervous system the organism at birth is already equipped to make certain reflexive responses, but the intricacy and the number of possible connections between nerves are such that a multiple causation takes place with reference to many responses, and likewise multiple responses are aroused by a single type of causation. This, according to the mechanists, leaves room for the "stamping in" of certain connections, while disuse permits others to atrophy and disappear.

The somewhat recent conception of the conditioned reflex is apparently an attempt to show, on the basis of Pawlow's ingenious experiments with the psychic stimulation of animals, that a substitution of stimuli may take place whenever an alien stimulus is associated with another to which the organism by virtue of its reflexive or inherited nature is predisposed to respond.

In the opinion of mechanists, all reactions of the organism are forced, and substitution through juxtaposition is the sole means of acquiring a modification of response.

As an alternative to this view of original nature I suggest that the stimulus is never a discrete entity; that it operates only as a formal pattern whose configuration, though ill-defined in the early experience of the individual, is effective, nevertheless, as a pattern, rather than as a discrete stimulus or as an aggregate of stimuli. Accordingly, the nervous structure of the organism is thrown into similar patterns of stresses and strains, and these corresponding patterns of nervous energy eventuate in the overt response or manifest behavior of the organism.

The characteristic of behavior is therefore one of uniformity rather than one of chaotic multiple responses. Similarly, the characteristic of perception, or the stimulation of the organism, is a pattern rather than a summation of stimuli of the multiple-causation type.

It follows that instinct is more typical of original nature than the reflex. The reflex approaches, though it never quite attains, the independence of a mechanism. Similarly, voluntary action is more typical of the educated being than habit, though habit again approaches, though it never quite attains, the status of a mechanism.

The acknowledged results of experiments with the conditioned reflex imply

the association of stimuli which seem to be quite diverse and unrelated; such, for instance, as sight and sound, in the case of Pawlow's dogs, who were taught through the conditioned reflex to respond with salivary and gastric secretions when they were shown certain colors or heard certain sounds that had been previously associated for a sufficient length of time with the presence of food. What these experiments reveal, I think, is that temporal and spatial aspects of the stimulus-complex are more effective than the qualitative nuances which the impression also contains. In other words, the sight of a color or the sound of a bell is integrated into the pattern of the normal stimulus. Thus in time these members come to effect the result by recreating the pattern even when some of its original qualities are lacking.

Although you may not be as ready as I am to give up the theory of mechanism with its doctrine of behavior as an assemblage of part-movements provoked by a combination of discrete stimuli, I hope you will at least agree that stimulus and response may be considered in terms of space and time as well as in terms of discrete qualities. As a promising field of investigation, then, I would suggest a study of *orthogenic forms*, both of stimulation and response, meaning those configurations of perception and response for which the organism is predisposed, and upon the basis of which its later development through education essentially depends.

Finally, this conception of original nature as an innate capacity for reactions of a *quantum* type has no need of recourse to the mysteries of vitalism or to the metaphysics of purposiveness. It merely substitutes the notion of "integrals" for the notion of "integers," and the procedure of analyzing wholes into parts as members of wholes, for the procedure which first seeks the parts as the elements or ultimates out of which the wholes are presumed to be assembled.

II

Passing now to the conception of learning, it is obvious to students of this subject that current hypotheses are mostly of a mechanistic type. We are told that we learn by forming habits, and that the simplest way of learning is by repetition. Practice makes perfect because exercise "stamps in" the bonds of connection between the ultimate parts in any sequential performance or act. All is thus reduced to the law of association with its subordinate principles of frequency, recency, and innate or acquired readiness for response. The interpretation of learning as a conditioned reflex adds nothing, so far as I can see, to the older principles of association, except that it restates them in terms of behavior without reference to any mental content. But the crux of the problem lies in the learning of a new act, in the achievement of a new adjustment; and whether this be under the conditions of a blindly groping trial and error, or whether it be the sudden and forthright adoption of a means to an end, the mechanistic interpretation fails because it does not allow for the continuity and the dynamic unity of organic behavior. A hungry organism seeking food is dominated by its desire. It seeks with its whole being, and all its behavior is integrated, not only with reference to its desire, but also with reference to the fulfilment of this desire. Thus the selection of a new mode of response involves a transformation of the situation, and the new act which is thus acquired integrates with the animal's desire and with its achievement, whereas the abortive acts which do not accomplish this end are eliminated, because they do not participate in this integration. Any attempt to break up the continuity of learning into separate acts, and to conceive them as being associated together as so many different parts ignores the observed facts of behavior. Furthermore, the attempt leaves us with the insoluble problem of ex-

plaining the selection of an appropriate or "right" action by means of something that affects the organism only after the act has occurred, namely, by means of the satisfaction that comes only after a way has already been found to attain it.

One of the most fundamental aspects of the pattern of learning is the underlying rhythm of behavior which demands completion and is satisfied only by the appropriate filling-in of the gaps which occur whenever an obstacle to the attainment of an end is introduced. In this connection the rhythms of organic behavior, as well as the corresponding rhythms of consciousness, are subjects of study which demand much closer investigation than they have thus far obtained. We are too apt, I think, to regard rhythm as a mere matter of a uniform succession of beats, whereas the patterns of organic behavior are likely to evince typical configurations of an order that can not be reduced to simple unilinear sequences of time.

III

The conception of individual differences must naturally undergo a change if we regard the individual as an integrated whole rather than as an assemblage of parts. But are not individual anomalies more accurately conceived as functional peculiarities within the general plan of behavior characteristic of the species than as structural defects, or the absence of parts, or peculiar combinations of parts? Starting with the orthogenic patterns of behavior which mark the most fundamental and most common characteristics of human beings, can we not trace the completeness or incompleteness of configurated traits and tendencies as they appear within the broader outlines of a typical response, and can we not then interpret individual differences more adequately in these dynamic terms than we now so often do in terms of structure? As our problem becomes more definitely functional, I think we shall also find that we have at hand a scheme of interpretation which readily embraces such aspects of the "unconscious" and of the Freudian doctrine as may commend themselves to us.

The notion of unit-characters, too, in so far as they apply to psychological traits and tendencies, is very apt to divert us from the true nature of behavior unless we hold fast to a functional conception. Regarded as patterns of response rather than as aggregates of part-activities aroused by an aggregate of differential sensitivities, traits of character such as moral delinquencies and turpitudes can be thought of as perverse formulations rather than as defects or accretions depending upon a peculiar sensitivity to discrete stimuli. Similarly, in the case of mental acuity and obtuseness, we can more readily comprehend the individual differences of brightness and dullness when these differences are measured with scales of more than one dimension.

Despite the brilliant results of our standardized measurements of intelligence, few, I fancy, would deny that these measurements are as yet both crude and general, and that what we now need is a reinvestigation and a reinterpretation of the individual, so that our general conception of what intelligence means may become much more precise than it now is. Only after we have passed below the level of complex symptoms, now recorded and interpreted in statistical terms, to the underlying conditions that determine these symptoms, shall we be able to understand the nature of the human traits and capacities we are testing.

It is a common characteristic of any new instrument, or of any new technique, that it should begin with applications to the more superficial and less analytical features of a problem; for only gradually can refinements of method be developed requisite to approach the fundamental

nature of the subject. The measurement of mind is already pursuing this course, but we are still in need of a more adequate conception of the individual traits we are now measuring. The psychology of mental measurement marked in some ways a revolt against the laborious type of analysis of conscious elements which the experimental psychology of a previous decade had more or less perfected. But it is to be hoped that our success in dealing statistically with the signs and tokens now employed in mental testing will not blind us to the necessity of underwriting these crude data with a much more exact and detailed knowledge of behavior than we can now possibly lay claim to.

We have been overready, I think, to conclude that mental defects were all hereditary, and also that such widely varying aspects of behavior as are evinced by the feeble-minded, by the criminally inclined, and by the vagrant types of humanity, all find a common origin in some specific structural defect of the germ-plasm. What is greatly needed is a key to these configurations of abnormal and of anti-social conduct that will enable us to trace them more adequately to their orthogenic origins. With this key in hand we can perhaps unlock some of the mysteries of individual variation which at present we refer in general terms now to inheritance and again to environment.

IV

The conception of school-work is likewise in need of reinterpretation, for here again the values of method and content are obviously relational and functional rather than static and structural. The theory of "identical elements," for instance, as being requisite for a transfer of training is in my opinion a perversion of the facts by its implication that study has to do with just so many counters which must be arranged in just such a sequence, in order to constitute knowledge and a basis of right action.

For my part, I believe that the instruments of knowledge and the instruments of conduct are both transitional media bridging gaps between perceived wholes, and thus creating new configurations of insight and intelligence. The perceived wholes first to be grasped are the orthogenic forms and figures to which we are predisposed by nature. In other words, these outstanding figures and patterns of response are the objects of experience and the types of behavior with which we begin our course through life. Education, then, is but the elaboration of these patterns, at first vague and crude, with which we are originally endowed.

From this point of view the emphasis placed by the Greeks upon music and gymnastics as the true basis of an education is highly illuminating; because it suggests that the Greeks were less concerned with the habituation of the contents of study than they were with the dynamics of form, both in mind and in body. Indeed, one can discover in the writings of Plato and Aristotle a method of education which to us at this late day has all the features of a novelty: an education in which rhythm, melody, and design replace to a very large extent the arid conning of words, and the exercise of hand and voice in the production of school results which have a significance only to the teacher.

In the observation of an infant's first untutored coordinations of movement we see everywhere this rhythmical transformation of the situation in which the infant finds himself. In bringing hand to mouth he effects such a transformation at a very early age. Later, he acquires the hand and object coordination of grasping; and still later he sees the object which he grasps and, in grasping it, is no longer directed by the felt thing alone, but also by its appearance. Only gradually does the child come to discern an object by the way it looks without the need of touching it, or grasping it, or manipulating it. In all

these varied forms of response rhythm guides the selection of the right orthogenic pattern and the rejection of awkward and inappropriate means.

So, too, in later operations with numbers and with words; at first both are members of the perceptual configurations of things seen, things heard, and things manipulated. Yet numbers and words have their own rhythmical patterns as melodies of speech, and as designs of vision; and the child learns these no less—indeed he learns them far more concretely—than he learns the detached meanings of numbers and words by themselves. Before he can speak he will carry on a conversation in cadences so true that those who hear him from a slight distance may suppose that they are listening to a real conversation. Even after he can speak the child is for a long time more intent upon the form of his utterance than he is upon the precise order of his words. I can perhaps illustrate this with an example from a child of three years and one month who was calling to her mother and, under the influence of an effort to make herself heard, produced the following extraordinary jumble of words: "Do Nannie want you me dress to?" What she meant to say was: "Do you want Nannie to dress me?"

It will be noticed that the correct form of the question was preserved, and every word uttered, yet no two words were in their proper sequence.

Why not follow the native, formal methods of the child in introducing him to the more precise knowledge which the curriculum of schooling is intended to provide? Why not renew our studies of infancy, and see if we can not secure a more accurate interpretation of child-life than we have hitherto obtained by our empirical touch-and-go methods? With a more esthetic conception of rhythm, of melody, and of figural design as our aid, perhaps we shall discover something of human nature which has never yet been fully comprehended.

We are making rapid progress in the development of a science of education, but problems from the field crowd upon us, and we are in constant danger of over-simplifying our fundamental principles. Critical insight is greatly needed in all that we undertake, and to become unduly impressed with any theory is likely to prove a fatal hindrance to our work. In suggesting a view of education that can be taken as an alternative to one which I have assumed to be widely held, I have tried to make a fairly drastic contrast between mechanism and what I have chosen to call integration or formulation. I have done this more with the intention of stimulating curiosity than of carrying conviction for a new theory; because what we need at the present time is not armchair philosophizing, but more critical experimentation of a kind calculated to test the hypotheses of our research. In this endeavor I think that educators to-day can gain much by cultivating open-mindedness, and also by turning their attention to some of the hypotheses that are becoming current in the physical and the biological sciences. If they do this they will see that the "mechanism of life," which many of them have adopted in principle, and which is at least implied in a great many of our current textbooks of educational theory, is far less simple than the schematic form in which it is often stated might lead one to suppose.

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EDUCATIONAL EVENTS

THE UNIVERSITY OF CALCUTTA

THE London *Times* states that strained relations have existed between the Bengal Government put forward far-reaching proposals for Calcutta for some time. The Bengal Government put forawrd far-reaching proposals for State control, which would have been vested less in the governor in council than in the education minister. This brought in a personal element

by reason of the quarrel between the government authorities and Sir Asutosh Mookerjee, the former vice-chancellor, who continues to be the *de facto* head of the senate.

Last month Lord Lytton, the governor of Bengal, summoned a round-table conference, in the belief that discussion would show substantial points of agreement between the parties. Until recently it had been hoped that Mr. Bhupendranath Basu, whose conciliatory attitude had already done much to smooth the troubled waters, would be in a position to serve the university for the full two-year term.

The round-table conference by Lord Lytton has adjourned until the cold weather. Though official reticence is observed, there is no doubt that the adjournment is a victory for Sir Asutosh Mookerjee.

Two bills which had been previously drafted by the Education Department were placed at the head of the conference agenda. This was calculated to arouse the senate, which had already rejected them on more than one occasion. At the first session of the conference it became obvious that fundamental differences existed between the senate and the Bengal Government. The meeting has made it abundantly clear that the bills are incapable of such amendment as would meet the senate's objections. The senate has now asked that a draft of its own proposals should be submitted to the Bengal Government, when the conference reassembles, if it ever does reassemble in its present form, in November or December. By then there will be a new vice-chancellor, probably Sir Bijar Burdwan, as Mr. Basu is resigning in October to take his seat on the recently appointed Royal Commission on the superior public services of India.

WELFARE AND EMPLOYMENT OF CHILDREN IN ENGLAND

GUIDANCE in the choice of employment and other phases of children's welfare in England is assigned to local education authorities by clause 6 of "The Unemployment Insurance Act, 1923," which was recently placed upon the Statute Book. This act replaces the Choice of Employment Act of 1910 by which the placing in employment was done by the officials of the Ministry of Labor. The change, which followed an investigation and report by Lord Chelmsford as to the success of the older plan, is characterized by a correspondent of *The Times Educational Supplement* as "an important forward movement" in bringing the educational and industrial worlds in England "into closer contact with reciprocal advantages."

Under the welfare clause of the new act local educational authorities will not only concern themselves with the education of children, but will also see that this education is turned to the best advantage when the children enter industries. "Care committees" attached to the schools will carry on this work on a much broader basis than previously. As expressed by the *Times* correspondent:

> The committees should be well equipped with information relating to industrial conditions, educational facilities—evening and technical and commercial schools and schools of art, and social and recreational facilities, old scholars' clubs, scouts, guides, and religious organizations—so that when the members of the committees visit the homes of the children they will be able not only to give advice about choice of employment but also about the most beneficial use of their leisure hours. By these visits the members of the committees gain valuable information on many social and industrial problems. In addition to this work the committees, mainly through their organizing or executive officers, will be responsible for the organization of play centers, clubs for scholars, and, if necessary, centers for unemployed juveniles.

The correspondent adds that the degree of success of the new work "will depend largely on the education and personality of the organizing officers."

A CONFERENCE IN SWITZERLAND OF TEACHERS IN "NEW SCHOOLS"

UNDER the auspices of the International League for the New Education, four hundred teachers of "new schools" in twenty-three countries of Europe met during August at the Collège de Montreux, at Lake Geneva, Switzerland, for a second international congress. The conference program considered "how the school, the teacher, and the method can be of greatest service to each individual pupil, and how each child can be trained to give the utmost service of which he or she is capable to the state and to humanity."

The conference met under the leadership of Mr. H. Baillie-Weaver, president of the organization committee of the International League for the New Education. The speakers are announced as having included Dr. Adolphe Ferrière, of the Institut Rousseau in Geneva; M. Jacques-Delcroze, of Geneva; Professor O. Cizek and Dr. Otto Rommel, of Vienna; M. Emile Coué, M. Charles Boudouin and Dr. Decroly, of Brussels; Dr. Elizabeth Rotten, of Berlin; Mme. Alice Jouenne, of Paris; Dr. Jung, of Zurich; and Mr. John Eades, of the Leeds Training College Demonstration School, England.

An exhibition was held of specimens of the work done in various new schools. It is stated that a full report of the conference will be available later at the office of the New Education Fellowship, 11, Tavistock-square, London, W. C. 1, England.

OBSERVANCE OF AMERICAN EDUCATION WEEK

PLANS for the observance of American Education Week, which this year comes the week of November 18–24, have been made public by the United States Bureau of Education. As an initial step in arranging for the week the bureau suggests that county and city superintendents secure the assistance of all the organizations in the counties or cities that are interested in education. The bureau says:

Possibly the best plan for school superintendents to follow would be to call a meeting of the representatives of the various clubs and societies interested for the urpose of perfecting an organization that would be responsible for plans for the observance of the week. At this meeting there might be chosen a permanent chairman and such other officers as the situation might demand. Committees composed of teachers and representatives of various organizations could be appointed to assist in making and carrying out the plans for the week. In the towns and smaller cities several general committees would be sufficient, but in the larger cities and in the counties there should be district committees. In a county there should be committees for each consolidated school district and for each one- or two-teacher school district. At least there should be some one in each district definitely charged with making plans for the observance of the week. A simple notice from the county superintendent to the teachers that the week of November 18 to 24 has been designated as American Education Week is not sufficient. He should see that someone in each district in his county is making plans, and, as just suggested, several committees in each district would be helpful.

The bureau suggests that the following committees be organized for each community: Press Committee, Poster Committee, Motion Picture Committee, Committee on Public Meetings, Speakers and Music, and Committee on Programs for the Schools.

American Education Week is sponsored by the American Legion, the National Education Association and the U. S. Bureau of Education.

EDUCATION FOR SAFETY ON THE HIGHWAYS

THE Highway Education Board has announced the renewal of its annual safety contests, in which $6,500 will be given away in prizes.

Training children in habits of highway safety is the principal task of the 1923 safety campaign, but through the children it is hoped that the principles of traffic regulation and safety education will be impressed upon adults, pedestrians and drivers alike.

The third annual safety campaign takes the form of two contests, one among elementary school pupils, and another among elementary school teachers. Approximately five hundred state and national prizes are to be given for the best essays and lessons written. The prizes offered are the gifts of the National Automobile Chamber of Commerce, which is desirous of reducing the number of accidents and fatalities due to traffic mishaps.

In the two previous years approximately 400,000 pupils and 50,000 teachers have participated each autumn. It is believed by board officials that the cumulative effect of these contests, and the increasing attention given to safety education will result in even a greater number of participants this year.

The subject of the essays which children are invited to write is "Highway Safety Habits I should learn." Essays, as last year, are not to exceed five hundred words in length. Those eligible are pupils of the fifth, sixth, seventh and eighth grades, who are not more than fourteen years of age. The contest opens with the

beginning of school, and closes on December 4, 1923.

Teachers are requested to submit safety lessons on the subject "Training children in habits of safety on the highways." The limit suggested is between 1,000 to 3,000 words. All elementary school teachers in the eighth and lower grades are eligible to submit lessons.

In the teachers' contest the first national award is five hundred dollars and a trip to Washington with all expenses paid. The second national award is three hundred dollars, while the third award is two hundred dollars.

The first national prize for the best essay by pupils is a gold watch and a trip to Washington with all expenses paid. The second and third prizes are each gold watches, one of slightly greater value than the other.

Four hundred and seventy-eight state prizes are offered pupils. The first state prize is a gold medal and a check for fifteen dollars. The second state prize is a silver medal and ten dollars. Third prizes, which vary in proportion to the elementary school population of the state, are bronze medals and checks for five dollars.

The board announces that the contests will be conducted with the cooperation of state departments of education, women's clubs, civic organizations, safety councils, automobile clubs, and kindred organizations that may wish to assist. Complete details will be furnished upon application to the Highway Education Board, Willard Building, Washington, D. C.

THE PRESIDENT OF WESLEYAN UNIVERSITY

AT a meeting of the board of trustees of Wesleyan University held at the Hotel Belmont, New York City, on September 7, Dr. William Arnold Shanklin presented his resignation as president of the university after fourteen years' service. Although Dr. Shanklin had just returned from a sixteen months' leave of absence, it seemed wise for him not to take up the arduous and taxing duties that go with the presidency of a college or university.

During President Shanklin's term of office the university experienced the most successful era in its history. The educational and financial assets of the institution have more than trebled and each department has been developed to give the highest possible service. Each year an increasing number of students have applied for admission to the university, but about a year ago the trustees, under Dr. Shanklin's leadership, decided to limit the student body to 500. This policy was in keeping with his desire to maintain the strictest scholastic requirements.

Dr. Shanklin was born in Carrollton, Missouri, sixty-one years ago and was educated at Hamilton College and Garrett Biblical Institute. He served as a pastor in the South Kansas, Upper Iowa, Columbia River, Puget Sound and Philadelphia Conferences, leaving the ministerial field in 1905 to become president of Upper Iowa University. He resigned in 1909 to become head of Wesleyan University and has continued in that capacity up to the present time. His record there is one which all the alumni and friends of Wesleyan point to with pride and affection. Nearly one half of the alumni have attended the institution as his students.

In accepting his resignation the trustees created the office of president emeritus and elected Dr. Shanklin to that office, thereby conserving to the university his valuable counsel and experience. No action has been taken to appoint a successor, according to Dr. David G. Downey, president of the board of trustees. During Dr. Shanklin's recent leave, Dr. Stephen Henry Olin acted as president. It is not considered likely that he will go back this year, however. Meanwhile, Dr. Leroy A. Howland, vice-president and Fisk professor of mathematics, will act as president.

EDUCATIONAL NOTES AND NEWS

SIR ROBERT BRIDGES, poet laureate of Great Britain, has received an invitation from the University of Michigan to fill the fellowship of creative arts at Ann Arbor for the coming year. The fellowship was founded by former Governor Chase S. Osborn, of Michigan.

THE ninety-first annual meeting of the British Association for the Advancement of Science opened at Liverpool on September 12 with the presidential address of Sir Ernest Rutherford, Cavendish professor of experimental physics at the University of Cambridge.

PROFESSOR I. P. PAWLOW, of Petrograd, was present at the International Physiological Congress, at which he made one of the three general addresses and was one of the members receiving honorary degrees from the University of Edinburgh. He was refused a British *visa* on leaving New York, but permission to land at Southampton (instead of Cherbourg) was obtained by wireless telegraphy during the voyage, through the enterprise of an American colleague and fellow-passenger, who communicated with an English physiologist.

THE American Mathematical Society announces that it has established an honorary lectureship to be known as the Josiah Willard Gibbs Lectureship in honor of the distinguished mathematical and physical chemist of Yale University who died in 1903. It is proposed to invite to it at intervals of perhaps a year a distinguished investigator who shall deliver an address in semi-popular form on some topic in mathematics or its applications. To inaugurate the series a committee has been appointed by the society to select the first lecturer and to arrange for the lecture to be given in New York City during the winter of 1923–24.

DR. BRADFORD KNAPP, dean of the College of Agriculture of the University of Arkansas, has accepted the presidency of the Oklahoma Agricultural and Mechanical College at Stillwater. Dr. Knapp will assume his new duties on the first of October.

DR. A. M. BOYD, president of Buena Vista College at Storm Lake, Iowa, has resigned his position there to accept one with the General Board of the Presbyterian Church. J. F. Saylor is acting president.

ERNEST THELIN, of West Virginia Wesleyan University, has been appointed head of the department of education of Yankton College, South Dakota.

DR. KARL T. WAUGH, professor of philosophy and psychology at Berea College, Berea, Kentucky, will become dean of the college of liberal arts of the University of Southern California beginning with the autumn term.

N. H. BALLARD has been inducted into the office of state superintendent of education of Georgia.

THE office of assistant superintendent of schools, carrying a salary of $8,000 a year, has been eliminated by the Chicago board of education. Mr. Ernest E. Cole, who held the position under the Thompson régime, resigned when Mayor Dever was elected to office.

FLORENCE M. NICHOLSON, formerly president of Cornell College Academy, has been appointed dean of women at Coe College in Cedar Rapids.

DR. FRANK H. HANKINS, formerly professor of sociology and economics at Clark University and a member of the faculty of Smith College, has been appointed to the faculty of Amherst to take the place of Professor W. H. Hamilton. Dr. Hankins will lecture on "The Present Economic Order," and on "Population Problems in Relation to Modern Life and Institutions."

IN honor of Miss Abigail E. Weeks, dean of women and professor of English at Union College, Barbourville, Ky., the chair of English at the college has been given her name. This action was taken at the request of the faculty and students, who subscribed $30,000 to the college endowment fund.

MORRIS INGERSOLL CRANDALL, of New York City, has been appointed professor of architecture in George Washington University. He has held a similar position in the University of Porto Rico.

DR. R. T. HANCE, instructor in zoology at the North Dakota Agricultural College, has resigned to engage in zoological research work for a special foundation of the University of Pennsylvania, and, at the beginning of the fall term, will be succeeded by Dr. A. D. Whedon, of the University of Pennsylvania.

GEORGE DEWEY, of the North Dakota Agricultural College, assistant to athletic director Stanley E. Borleske, has been appointed assistant professor of physical education and assistant director of athletics.

IN the University of Texas Department of Medicine, Galveston, Dr. H. O. Knight, formerly associate professor, has been promoted to full professor of anatomy; Dr. George E.

Bethel, to be adjunct professor of anatomy, and Drs. G. W. N. Eggers, C. R. Enloe and E. M. Jordan instructors in anatomy.

JOHN L. EBAUGH, Jr., for the past two years instructor in chemistry at Tulane University, New Orleans, has been appointed instructor in chemistry at the Drexel Institute, Philadelphia.

DR. GEORGE EDWIN JOHNSON, professor of biology in the University of Porto Rico from 1917 to 1921, has been called to the chair of biology in the University of Mississippi.

HENRY R. HALL will replace Frederick A. Cleveland as lecturer on United States citizenship in the College of Liberal Arts of Boston University this fall.

MISS GRACE SCHERMERHORN, director of home-making in the public schools of New York City for the past six years, has resigned to become associate director of the health education division of the American Child Health Association.

EDWARD R. GAY, former assistant dean of Harvard College, has been appointed executive secretary of the Council of Schools of Religion, with offices at New Haven, Conn.

FRANK C. BRODHEAD, who has been identified with a publishing house of Philadelphia, has been appointed secretary of the alumni council of Wesleyan University. He succeeds Arthur B. Haley.

DR. HENRY COE CULBERTSON, who for eleven years was president of the College of Emporia, Kansas, is now manager of the Clark Teachers' Agency at Los Angeles, California.

DR. DON C. BLISS, principal of the State Normal School at Trenton, New Jersey, has been appointed chairman of a committee to investigate failures of students in examinations for entrance to the state normal schools of New Jersey.

MISS ADELINE B. ZACHERT, director of school libraries for the State of Pennsylvania, is investigating library conditions in the public schools of Bangor, Maine. Miss Zachert is conferring with local authorities to the end that progressive steps may be taken in the recently inaugurated campaign for book deposits in the schools.

WILLIAM ROSCOE THAYER, the distinguished author of biographies, an overseer of Harvard University, died in Cambridge on September 7.

PROFESSOR RAYMOND M. ALDEN, of the English department of Stanford University, who is on a sabbatical year, is giving a course in poetry at Swarthmore College this semester.

W. T. LOPP has been transferred from Seattle, Wash., to Anchorage, Alaska, where he will maintain direct supervision over Alaskan schools and over the reindeer service, which is under the Bureau of Education.

ADDISON E. MULLIKIN, member of the Baltimore School Board, has returned from a trip to make a special study of the methods of English schools and universities. Mr. Mullikin will report to the school board what methods of English schools could in his opinion be adopted to improve the local schools.

PROFESSOR W. G. CADY, of Wesleyan University, has returned from a half year's leave of absence abroad, in the course of which he made a series of comparisons of radio wave-length standards in Italy, France and England.

MISS MARGUERITE GAUGER, professor of home economics in Des Moines University, who was a member of the government commission assigned to study the nutrition of children in Belgium, has returned to Des Moines. After completing her work in Belgium she visited the principal colleges and universities of England.

DR. J. F. KESSEL, who has been during the past year university fellow in zoology at the University of California, sailed on August 21 for China, to take up his work as instructor in biology in the pre-medical school of Peking Union Medical College.

SPEAKERS at the Maine Teachers' Institutes to be held during the month of October will include Mrs. Cora Wilson Stewart, of Frankfort, Ky., chairman of the Illiteracy Commission of the United States; J. O. Engleman, of Washington, field secretary of the National Education Association, and Princess Santa Borghese, of Italy, a delegate to the World Conference on Education recently held in California. Deputy Commissioner of Education B. E. Packard has been appointed director of the county education

associations to cooperate with the county presidents and committees.

A CIVIL SERVICE examination for teachers of home economics will be held throughout the country on October 17. It is to fill vacancies in the Indian Service, at entrance salaries ranging from $760 to $840 a year, plus the increase of $20 a month, and vacancies in positions requiring similar qualifications. Furnished quarters, heat, light and subsistence are allowed appointees free of cost. Where a physician is included in the personnel, employees are given free medical attention. The duties of the position are to teach home economics in the Indian schools. Competitors will be rated on the subjects of methods of teaching, home management, foods, clothing and sewing, and education, training and experience.

BY the will of James G. Knowles, partner in Timothy Smith and Co., of Roxbury, Mass., bequests amounting to $400,000 are provided for Protestant, Roman Catholic, Jewish and negro educational, charitable and religious institutions, many of which distribute relief funds among the people who are patrons of the store with which Mr. Knowles was associated.

BEGINNING on October 22, Northwestern University will start a campaign to raise five and a half million dollars for endowment and new buildings. Elbert H. Gary, chairman of the board of directors of the United States Steel Corporation, will be chairman of an honorary advisory committee composed of men prominent in western industry, banking and politics that will assist in the campaign.

A PROTEST against admitting to probate the will of Austin Barclay Fletcher, a lawyer, who died on July 5, leaving the bulk of his $3,000,000 estate to Tufts College, was filed in New York on September 10 by Charles A. Fletcher, Loren L. Fletcher, Mary A. Blaisdell and Clare Williams, all of Mendon, Mass., and Henry F. Fletcher, of Hazardville, Mass. The protestants are cousins. The action contends that Mr. Fletcher's will was improperly drawn and that he was unduly influenced in disposing of his fortune. Mr. Fletcher was graduated from Tufts College in 1876. He was president of the board of trustees of the college and a trustee of Boston University and Dean Academy, and president of the National Institute of Social Science.

AT the Edinburgh meeting of the International Physiological Congress an invitation to meet in America was presented by Professor A. J. Carlson, president of the American Physiological Society, and an international committee was appointed to consider the possibility of accepting it for 1926. The International Congress of Psychology at Oxford also considered the question of meeting in the United States three years hence.

THE United States Bureau of Education will hold a conference on the training of secretaries, in Boston, on October 27. This conference will be held in cooperation with Boston University during the celebration of the fiftieth anniversary of the founding of that university, and will form part of the program of the conference of the College of Secretarial Science. Dean T. Lawrence Davis, of the university, will be in charge of local arrangements.

THE eighth summer meeting of the Mathematical Association of America was held at Vassar College, Poughkeepsie, New York, on Wednesday and Thursday, September 5–6, in conjunction with and immediately preceding the summer meeting of the American Mathematical Society which was continued on Friday and Saturday. A joint session of the two organizations was held on Thursday afternoon, and the joint dinner was held on Thursday evening.

IN a letter of Governor Gifford Pinchot, of Pennsylvania, recently made public, he states that he had approved an appropriation of $38,000,000 for the elementary schools for the present biennium, which, he said, was $8,000,000 more than ever had been appropriated for Pennsylvania's schools. He also called attention to the appropriations for the normal schools and the administration of the Department of Public Instruction, which, he declared, were approved in the sums asked by Dr. Thomas E. Finegan, former state superintendent of public instruction. A deficiency appropriation of more than $3,000,000 for the payment of teachers' salaries had also been approved.

THE Boston public schools cost $11,778,441

for the year ended January 31, 1923, according to a report recently presented to the Boston School Committee by W. T. Keough, business agent. Of the amount, $8,297,755.32 went for general school purposes, including Americanization and vocational guidance work. Repairs, alterations, protection against fire and fire hazard and new furniture and furnishings for old buildings, including new lighting fixtures, cost $1,099,999.84. Fuel and light cost $640,606.31.

NEW YORK CITY school officials said on September 11 that 13,347 of the promised 14,036 new sittings were available. More than 300,000 pupils are still on part-time and double session schedules.

THE enrollment this month in the Catholic elementary schools of New York City is about 165,000, according to a statement of Monseigneur Joseph F. Smith, superintendent of the New York Catholic School Board. Eleven new Catholic schools have been opened and a number of other buildings now under construction will soon be ready. The registration in parochial schools is said to be about one sixth of the number of pupils in public schools.

A DECREASE of 644 in the number of students of electrical engineering enrolled in 129 technical schools of the United States for the year 1922–23 as compared with 1921–22 is shown by figures compiled by Walton St. John, of the United States Bureau of Education, the respective totals being 13,275 and 13,919. Similar decreases are shown in the registration for other branches of engineering, civil engineering, with an enrolment of 12,802, showing a loss of 1,590; mechanical engineering, with an enrolment of 14,453, a loss of 1,561; chemical engineering, with an enrolment of 7,054, a loss of 1,668, and mining and metallurgical engineering, with an enrolment of 2,895, a loss of 234.

SCHOOL children of the country saved $9,500,000 during the school year of 1922–23, according to figures given out by the savings bank division of the American Bankers' Association. The savings by children during the last school year showed an increase of $3,500,000 over the previous year. Among the cities of the country with a school enrollment of more than 10,000, the ten leading in total savings last year, with the amounts, are as follows: Pittsburgh, $569,585; Providence, R. I., $424,492; Minneapolis, $167,056; Akron, O., $147,778; Trenton, N. J., $130,862; Memphis, Tenn., $123,075; Wilkes-Barre, Pa., $121,204; Toledo, O., $116,043; Rochester, N. Y., $108,973; Duluth, Minn., $100,856. Memphis led in the percentage of pupils participating with 97 per cent.

RESULTS obtained in the regents examinations of January, 1923, by high-school pupils of New York have been given out at the office of Dr. Ettinger, superintendent of schools, in a letter to him from John L. Tildsley, district superintendent. The letter reads in part: "In the subjects which were examined 87,644 pupils were enrolled. Of this number 84,359 took the examinations, and of these 70,095 passed, or 83.8 per cent. of those who wrote papers. Although the results for the entire state are not yet available, it is interesting to note that our average for all subjects is 2 per cent. higher than the average for the state in the examinations of 1920, 1921 and 1922. It is safe to conclude that the teaching in the high schools is on the average superior to that in the rest of the state. The range in the per cent. of pupils passing was surprisingly large between schools in some subjects, notably in chemistry, ranging from 28 per cent. for one school and 33 per cent. for another to 94 per cent. in a third. These great differences in the results of these tests in the different high schools require explanation. After reading the explanations offered by the principals I am led to believe that some schools have gone too far afield on individual lines. I further believe that these tests have furnished additional evidence that we have some weak chairmen who should be replaced by others. Also that where tests prepared by some one other than the teacher of the class are not regularly given, the pupils are not being trained to meet the tests of life. These should be given with but a brief warning in order to prevent special preparation for the examination."

THE American Child Health Association has appropriated $10,000 for resident and traveling scholarships to physicians. These scholarships afford an opportunity to secure training in child health work which will fit holders to fill positions with state and municipal divisions of child health or organizations engaged in child

health work, or will enable physicians already engaged in the child hygiene field to secure additional training or experience. The fund will be allotted in amounts suited to the objectives arranged for the respective students. Applicants eligible for these will be physicians who are in good standing in their local and state medical societies, and who shall present evidence of the following qualifications: (a) Graduation from a Grade A medical school and a license to practice in the state from which they apply; (b) real interest in child health; (c) either special instruction or practical experience in public health or child hygiene, including school health work. Those who have had such experience will be given preference in the selection of candidates.

IN an address before the American Home Economics Association on July 31, Miss Grace Abbott, chief of the U. S. Children's Bureau, stated that child labor is increasing. She urged a constitutional amendment giving to Congress the power to prohibit and regulate labor, a power which, according to Supreme Court decisions, she said Congress apparently did not now possess. One million children between the ages of ten and sixteen were employed in January, 1920, she said, of which one third were from ten to thirteen years old. Owing to industrial depression in 1921 the number diminished but since then reports received by the bureau from twenty cities out of thirty-one reporting indicated increases, five cities reporting 100 per cent. In the first quarter of 1923 in Baltimore, Bridgeport, Detroit, Hartford, Indianapolis, Jersey City, Manchester, New Britain, Newark, New Haven, New York, Paterson, St. Louis and Waterbury, the percentage of increase over 1922 was given as 24 by Miss Abbott. June of the present year saw sensational increases, especially in Connecticut, where, in Waterbury, 800 per cent. more received work permits than in June, 1922, and a general increase of 57 per cent. was reported.

DISCUSSION

AN INDIVIDUAL FILING CARD FOR PRESERVING TEST DATA

IN January, 1921, Chisholm, Minnesota, entered upon a program of testing which, while not elaborate or exhaustive, was comprehensive enough to satisfy immediate needs. The results were to be used as a background for subsequent testing and needed to be in convenient form for frequent reference. For that purpose the accompanying filing card was devised. As it has met our needs up to the present time, and is expected to do so for some time to come, it seems probable that other systems may find it useful.

The group tests given in Chisholm in 1921 were the Monroe Silent Reading Test, Trabue Language Completion Tests, Woody Arithmetic Tests, four fundamentals, Scale A, and the Arthur and Woodrow Intelligence Tests. These tests were selected upon the assumption that, although the success of a primary child is conditioned only by his native ability, physical condition and the skill of the teacher in teaching the subject matter of the grade and in controlling emotional factors, the success of the upper grade pupil is dependent also upon acquired skill in comprehending printed matter, and in dealing with arithmetic fundamentals. Hence, in placing an upper grade pupil, information as to the degree of skill in reading comprehension and in the use of the fundamental mathematical processes is necessary, as well as information in regard to his general intelligence.

The filing card was made in accordance with this assumption and is designed to preserve all scores in tests of the same general nature that may be given during the child's entire school

Name_____ Date of Birth_____

Date	Grade	T. E.	C. A.	M. A.	I. Q.	R. S.	R. A.	L. S.	L. A.	Add.	Sub.	Mult.	Div.	Arith. Age	Ach. Age	A. Q.

career. It is made approximately the same size as the score card for the Kuhlmann 1922 Revision of the Binet-Simon Scale, so that the same filing cabinet can carry both. The column headed *Date* is, of course, for the date of the giving of the test. Where the test is an individual intelligence examination, this may be indicated by the word *Binet* entered just above the date, in the same space. The column marked *Grade* gives space for the school, grade and class of the pupil at the date of testing. *T.E.* is for the teacher's estimate (E, VG, G, F or P) of the pupil's average scholarship or efficiency in the "solid" subjects such as reading, arithmetic, history, geography, etc. *C.A.* is, of course, the chronological age of the child at the date of testing. *M.A.* indicates his mental age as shown by the tests, and *I.Q.* his intelligence quotient. *Read.S.* is for his score in the reading test. *R.Age*, or reading age, indicates the mental age group that makes this reading score as its average score. When a reading test is given for which mental age norms have not been established, grade norms may be substituted, and the grade to the norm of which the reading score corresponds may be entered in this column. *Lang.S.* is the score of the pupil in the language test, *L.Age* being the mental age to which this score corresponds. Where mental age norms are lacking, grade norms may be substituted as in R.Age. *Add.* gives space for the score in the addition test, *Sub.* for the subtraction score, *Mult.* for the score in multiplication, and *Div.* for the score in the division test. A.Age, arithmetic age, is the average of the four mental ages corresponding to the scores in the four fundamental processes. For this, grade norms may be used when necessary as in R.Age and L.Age, and the result will be the average of the four grades to the norms of which the pupil's scores correspond. The *A.A.*, or achievement age, is the average of the reading age, language age and arithmetic age, or in case grade norms are used instead of mental age norms, it is the average of the reading grade, language grade and arithmetic grade. The achievement quotient, *A.Q.*, expresses the relation between the achievement age and the mental age. The whole gives a picture of the child's performance upon the date or dates of testing that is invaluable when decisions have to be made in regard to placing, etc.

A single card on file in the cabinet serves to explain the specific reading, language, arithmetic or intelligence group test that was given to the school at a given date, and saves the labor of recording it on each individual filing card. As stated above, individual intelligence examinations are indicated by the word *Binet* written above the date of testing. The last column of the card was purposely left vacant. This is used for making note of any abnormal conditions extreme enough to affect test results, such as severe defect of vision or of hearing. In larger systems where the department of research consists of several members, this column can be used for the initials of the examiner.

A card such as this when folded and held by a bit of gummed paper can be readily mailed, and would serve to interpret the report card or promotion slip which accompanies a pupil when he is transferred from one system to another. When a pupil is transferred to a system that does not make use of intelligence data, a duplicate card might be sent on which the educational test data only were recorded with grade norms substituted for mental age norms.

GRACE ARTHUR

CHISHOLM, MINN.

QUOTATIONS

THE COST OF EDUCATION

THE cost of the schools and their enormous and growing budgets brought forth statements a few months ago from the president of the Carnegie Foundation for the Advancement of Teaching which stirred the educational world and have evoked widespread comment and discussion. The subject is recalled as the New York schools open with inadequate provision for the new year and as the larger budgets for the next year are being submitted, looming as they do above the present expenditures. The statements referred to are that "the present cost of schools is sorely taxing the ability of the American people to support them" and that under the "enormous load" of taxation that society carries "communities will rise against the burdensome cost of public education."

"Enormous" is a relative term. The cost is truly enormous, for example, compared with what Russia is spending. It is enormous compared with what China is spending. But it

can hardly be said to be enormous when put beside our total wealth or national income. The cost of all public elementary and secondary schools in 1920, estimated at a little over a billion dollars, was four tenths of 1 per cent. of the national wealth, 1 4/10 per cent. of the national income, and less than 7 per cent. of the amount of money lying in the "savings accounts" of the banks in 1921. That is the "relativity" reply that the National Education Association makes to the Carnegie Foundation report.

In 1920, for further example, our people spent seventeen dollars for luxuries for every dollar that they spent for education, and eight and one half dollars for other forms of public service as compared with one dollar for education. Moreover, though there has been seemingly an "enormous" increase in educational expenditure in recent years, the percentage of income spent for education has not greatly risen since 1910 and is, in fact, less than in 1914. These at any rate are the conclusions reached by the Research Division of the National Education Association.

The sum spent on education sounds "enormous." But when reduced to its lowest terms—the cost to each individual—it seems very small. Taking the country over, it is about 3 cents per person per day. It seems hardly fair to charge education with the excessive burden of which it is such a small part. We are able to give without "sorely taxing" our ability what is needed to provide adequate school advantages for all, if only we regard the education of our children as a primary duty of the state. It is a matter of priority of interest and not a question of ability.—*The New York Times.*

EDUCATIONAL RESEARCH AND STATISTICS

TRAINING IN THE TECHNIQUE OF THINKING AS A MEANS TO CLEARER THINKING

THE PROBLEM AND ITS SIGNIFICANCE

To what extent and how can children be taught to reason? There has been little done to date in the way of attempting to answer this question. It would seem likely that a technique for doing so could be worked out without great difficulty, by analyzing the specifics that children lack when confronted by situations demanding reasoning, giving systematic instruction and training in the use of these specifics, and then testing the results of the training.

Educators would doubtless agree as to the importance of cultivating ability to reason. There is, too, sufficient evidence to the effect that people in general often fail to reason when the facts needed for the solution of the problem are within their ken. Also if there be specifics in the way of habits and attitudes that would influence one's responses in reasoning situations, it would surely be a matter of the greatest importance to establish such reactions *in the days of childhood.*

In as much as reasoning involves classification and differentiation, it would seem probable that a habit of thinking clearly and of stating clearly what the thing under consideration is, might have a bearing upon one's skill in reasoning. In fact many an argument is terminated when the parties concerned get to the point of clearly defining their terms. Students at all stages of schooling allow themselves to fall into loose, careless habits of thought in defining. What instructor in psychology has not been confronted with such statements as these—"A habit is when you do a thing many times."—"Play is where you forget yourself and do things wholeheartedly," etc. In many cases the students have sufficient knowledge to make more definite and accurate statements, but either they lack the technique of defining, or they have been allowed to form slovenly mental habits in this particular. Surely we need systematic experimentation as to methods by which greater precision of thought and expression may be secured in children of school age, and measurement of the results of efforts designed to secure these ends. The experiments here reported represent a beginning in this direction:

Experiment I: Can Fifth Grade Children Assimilate and Apply the Principle of Logical Definition?

Two fifth grade classes were asked to define each of the following words: Dog, dime, garage, doctor, chair, chimney, milk, morning, honey, lightning. They were then given an eighteen minute lesson on the method of logical definition, using as illustrations the words breakfast, hammer, baseball. Immediately after this in-

struction they again defined the above mentioned ten words. Six per cent. showed no improvement. Six per cent. showed improvement in every word in which improvement was possible. The average result indicated perceptible improvement in thirty-four per cent. of the words defined. Illustrations of the improvement due to the instruction period of eighteen minutes follow:

BEFORE INSTRUCTION	AFTER INSTRUCTION (Same individual)
Morning is when it gets lighter outside.	Morning is the break of day, when light appears.
Lightning. When it is getting ready to rain a flash goes through the sky.	Lightning is a flash of light which goes through the sky before it rains.
Morning is when we go to sleep at night and get up in the morning.	Morning is day at first time at sunrise.
A chimney is something to let smoke out.	A chimney is a square brick thing on the top of a building or house to let smoke out.
Milk is to drink.	Milk is something to drink, it is white with pale blue around the edge.
A dime is a piece of money.	A dime is a piece of money equal to ten pennies.
A chair is a thing to sit. It has four legs, a back, 2 arms to put your arms on.	A chair—furniture to sit in, only one person.
Lightning is something in the air.	Lightning is something in the air that is red that flashes when it rains.

Thus the improvement is shown in better classification, addition of differentia and greater precision.

The conclusion is that nearly all fifth grade children can readily grasp the principle of logical definition, and apply it immediately in defining other words. It is therefore reasonable to expect that they could be made to form habits of more exact thought and of statement as to what common things are, by a sufficient amount of practice in doing so, and the necessary attention given to the *elimination* of the loose thinking and expression now so commonly accepted.

Experiment II: What will be the Result of Further Training in Definition?

Thirty-four 6th grade children were given test B, which required them to define the ten words—Dress, uncle, circle, hunger, map, pistol, soil, flag, wool. On the basis of their results in defining, they were then divided into two groups of equal ability in defining. One group was then given six lessons of 35 minutes each in defining, extending over a period of three weeks, while the other group had no such instruction.

At the end of the period of instruction, each group was again required to define the original ten words. Both groups—that which had received the training in definition and that which had not—showed improvement, according to the method of scoring adopted. But while the untrained group showed 10 per cent. improvement, the instructed group showed 61 per cent. improvement. On the basis of experiment I, we may conclude that probably more than half of this improvement was the result of the instruction of the first lesson. The fact that the average improvement for the instructed group was no greater than 61 per cent. may be largely accounted for by two facts: (1) In certain cases there was no room for improvement upon the definition originally given. For example, the pupil who in the first instance defined GARAGE as a building to keep automobiles in, could not be expected to improve such definition as a result of the instruction given. (2) In other cases the child lacked sufficient knowledge to give a satisfactory definition, even if he did grasp fully the principle of defining.

Experiment III: Will Instruction in Definition Result in Transfer of the Improvement to Thinking and Expression Less Closely Related to the Instruction Given?

Test C.—Analysis of likenesses and differences was given to both groups, the instructed and the uninstructed, first after two periods of instruction, and finally after the completion of the whole six lessons.

Test C is as follows:

1. In what way are an aeroplane, a street car and a bicycle alike?
2. In what way are salt, flour and sugar alike?
3. What is the difference between a picnic and a party?

4. In what way are a picnic and a party alike?
5. In what way are a soldier and a sailor alike?
6. In what way are a sailor and a soldier different?
7. In what way are an acorn, a grain of wheat and a peach pit alike?
8. In what way are dogs, eagles and lions alike?
9. In what way are a school, an army and a factory alike?
10. What is the difference between a right action and a wrong one?

The results were scored by giving two points for a good answer, one for an answer partly correct, and nothing for a wrong answer. In marking a paper the scorer did not know to which group the individual belonged—the instructed or the uninstructed.

At the end of the first two periods of instruction, the instructed group scored 9 per cent. more on the average than the uninstructed. It is significant that this improvement is slight in comparison with the improvement made at the first in definition. Apparently the explanation is that it takes *longer* to get into the way of applying a principle under somewhat new conditions than to apply it to conditions like those in connection with which it was learned.

At the end of the four remaining periods of instruction, both groups showed further improvement, but whereas the uninstructed group showed improvement in 4 per cent. of the answers given, the instructed group showed improvement in 24 per cent. of the answers given—a difference of 20 per cent. due to the instruction given in the last four lessons on the technique of defining.

It is to be noted that while in defining, at least half of the total improvement attained, resulted from the first 18 minutes of instruction, on the other hand the improvement in stating likenesses and differences (test C) was much slower at the beginning, but continued apparently without diminution as long as the instruction was carried on (6 lessons). Evidently it takes time and practice in the use of a principle before children are ready to apply it in somewhat new fields, as is indicated by the fact that the transfer effect to test C (similarities and differences) was 9 per cent. in the first two lessons (4½ per cent. for each lesson) and 20 per cent. for the remaining four lessons (5 per cent. for each lesson).

Experiment IV: Will the Instruction in Definition Show a Transfer Effect to Problems in Reasoning?

Test D, consisting of six problems in practical reasoning, was given to both groups at the end of the 6 periods of instruction.

The results were scored by allowing two for a good answer, one for a partly correct answer and nothing for a wrong answer. Both groups scored practically the same, so that there was no evidence of any improvement in reasoning as a result of the instruction in defining. However, hunting for the results in reasoning with the six little problems constituting test D is like looking in a 2 x 4 patch for something lost in a ten-acre field. The factors involved in reasoning are, of course, many and complex. The answers to the problems given suggest certain specifics that should be taught if these particular children are to gain in ability to solve such problems as were here given.

Pupil A, for instance, gives clear indication in two errors out of the five she made that she was merely depending upon the judgment of others rather than weighing the evidence for herself. It would be instructive to give a lesson on this one point and to measure the results by use of the same and of additional problems. A rough tabulation of the reasons for incorrect conclusions shows reliance upon the positive statements of some one else as the commonest fault.

CONCLUSIONS

1. Fifth or sixth grade children can readily understand the technique of logical definition and apply it in defining other words.

2. They can also apply the principle in analyzing likenesses and differences but in this case it takes longer for the improvement to be brought about.

3. There is no evidence in the very limited amount of testing so far carried out that training in the technique of definition has any effect upon ability to solve problems in every-day reasoning.

In general the field would appear to be a fruitful one for extensive investigation.

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